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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/675,116	09/28/2000	Grzegorz J. Czajkowski	SUN-P5075-RSH	9136

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EXAMINER

ALI, SYED J

ART UNIT	PAPER NUMBER
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2127

DATE MAILED: 11/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/675,116

Applicant(s)

CZAJKOWSKI ET AL.

Examiner

Syed J Ali

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 September 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-21 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Gosling (USPN 5,668,999).

As per claim 1, Gosling discloses a method for verifying type safety of an application snapshot, the application snapshot including a state of an executing program that is moved from a first computing device to a second computing device across a network in order to continue execution on the second computing device, the method comprising:

receiving the application snapshot from the first computing device on the second computing device, wherein the application snapshot includes a subprogram, an operand stack, and a point of execution (col. 6 lines 28-46, “The stack snapshot storage structure 346 is bifurcated into a directory portion 348 and a snapshot storage portion 350. The directory portion 348 is used to store target instruction identifiers [e.g., the absolute or relative address of each target instruction] while the snapshot portion 350 is used to store virtual stack 344 snapshots associated with the target instruction identifiers”);

examining the application snapshot to identify the subprogram and the point of execution within the subprogram (col. 7 lines 31-44, “A first pass is made through the bytecode program in

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order to extract target information associated with conditional and un-conditional jumps and loop instructions....For instance, the absolute or relative address of the target instruction may be stored in the next available slot of the directory”);

examining the subprogram to determine an expected structure of the operand stack at the point of execution (col. 7 line 58-65, “a second pass through the bytecode program is initiated in order to verify proper use of the operand stack and of data types by the bytecode program”);

validating that the state of the application snapshot on the second computing device is consistent with the expected structure of the operand stack (col. 7 line 58-65, “a second pass through the bytecode program is initiated in order to verify proper use of the operand stack and of data types by the bytecode program”); and

if the state of the application snapshot is validated as consistent with the expected structure of the operand stack, resuming execution of the application snapshot on the second computing device (col. 10 lines 56-64, “If no more instructions are to be processed, then the verifier will then set a verification status value 245 for the program to True (544), signaling the completion of the verification process”).

As per claim 2, Gosling discloses the method of claim 1, wherein examining the subprogram to determine the expected structure of the operand stack at the point of execution involves examining the subprogram with a code verifier, wherein the code verifier ensures that:

the subprogram does not cause the operand stack to overflow and underflow (col. 8 line 46 - col. 9 line 18, “If the operand stack has insufficient data [452] for the current instruction, that is called a stack underflow, in which case an error signal or message is generated”, “If the

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operand stack has insufficient room to store the data to be pushed onto the stack by the current instruction [472], that is called a stack overflow, in which case an error signal or message is generated”);

a use of a local variable does not violate type safety (col. 10 lines 16-27, “If the currently selected instruction reads data from a local variable [510], the verifier will compare [512] the data type code information previously stored in the corresponding local variable with the data type requirements”); and

an argument of an instruction is of an expected type (col. 6 lines 6-13, “for each datum that would be popped off the stack for processing by a bytecode instruction, the verifier pops off the same number of data type value off the virtual stack 342 and compares the data type values with the data type requirements of the bytecode”, wherein the datum that is popped off the stack includes operands as well as any operations and arguments associated with the instruction).

As per claim 3, Gosling discloses the method of claim 1, wherein the operand stack contains at least one local variable, at least one argument that is passed as a parameter to the subprogram, and an offset to the point of execution within the subprogram (col. 5 lines 21-29, “the verifier 240 uses a stack counter 342, a virtual stack 344, a virtual local variable array 345, and a stack snapshot storage structure 346”; col. 6 lines 6-13, “for each datum that would be popped off the stack for processing by a bytecode instruction, the verifier pops off the same number of data type value off the virtual stack 342 and compares the data type values with the data type requirements of the bytecode”; col. 6 lines 28-46, “The directory portion 348 is used to

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store target instruction identifiers [e.g., the absolute or relative address of each target instruction]).

As per claim 4, Gosling discloses the method of claim 2, wherein the expected structure of the operand stack includes a collective size of entries and the types of entries expected on the operand stack at the point of execution within the subprogram (col. 7 lines 20-30, “The verifier 300 creates [402] the virtual stack 344 and creates the virtual local variable array 345 by designating arrays of locations in memory to store operand and local variable data type information...[and] designates [406] a register to act as a stack counter 342 for keeping track of the number of virtual stack entries”).

As per claim 5, Gosling discloses the method of claim 1, further comprising restoring the state of an object within the application snapshot on the second computing device by changing a pointer from an address of the object on the first computing device to an address of the object on the second computing device (col. 6 line 62 - col. 7 line 9, “The bytecode program 350 includes instructions for stack manipulations 352 and 354 [push integer onto the stack and pop integer from the stack respectively], a forward jump 356 and its associated target 364, a backwards jump 366 and its associated target 362, and a do loop 358 and its associated end 360 [which may be an unconditional or conditional branch instruction, depending on the type of do loop]”, wherein when the bytecode program is downloaded, verified, and set to run on the target machine, the target address of the instructions are changed to correspond to the new machine on which it will be executed).

As per claim 6, Gosling discloses the method of claim 4, wherein validating that the state of the application snapshot on the second computing device is consistent with the expected structure of the operand stack involves ensuring that the collective size of entries and the types of entries on the operand stack agree with the collective size of entries and the types of entries expected on the operand stack (col. 9 lines 44-62, "In the preferred embodiment, a mismatch will arise if the current virtual stack and snapshot do not contain the same number or types of entries. Furthermore, a mismatch will arise if one or more data type values in the current virtual stack do not match corresponding data type values in the snapshot").

As per claim 7, Gosling discloses the method of claim 1, wherein resuming execution of the application snapshot involves restarting the subprogram at the point of execution within the second computing device (col. 6 line 62 - col. 7 line 9, "The bytecode program 350 includes instructions for stack manipulations 352 and 354 [push integer onto the stack and pop integer from the stack respectively], a forward jump 356 and its associated target 364, a backwards jump 366 and its associated target 362, and a do loop 358 and its associated end 360 [which may be an unconditional or conditional branch instruction, depending on the type of do loop]", wherein the associated target instruction is loaded on the second machine, and the execution of the bytecode program is resumed at said target instruction).

As per claims 8-14, Gosling discloses a computer-readable storage medium storing instructions that when executed by a computer causes the computer to perform the method of

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claims 1-7, respectively (Fig. 2, wherein a client/server model is disclosed for implementing the verification method of claims 1-7, respectively. Furthermore, a computer-readable storage medium is part of both the client and server systems, and would store the bytecode programs to be verified, as well as the verification module).

As per claim 15-21, Gosling discloses an apparatus that implements the method of claims 1-7, respectively (Fig. 2, wherein the client/sever model disclosed is an apparatus that stores the bytecode programs to be verified, as well as the verification module).

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Syed J Ali whose telephone number is (703) 305-8106. The examiner can normally be reached on Mon-Fri 8-5:30, 2nd Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William A Grant can be reached on (703) 308-1108. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.



Syed Ali
November 21, 2003



WILLIAM GRANT
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100

11/25/03